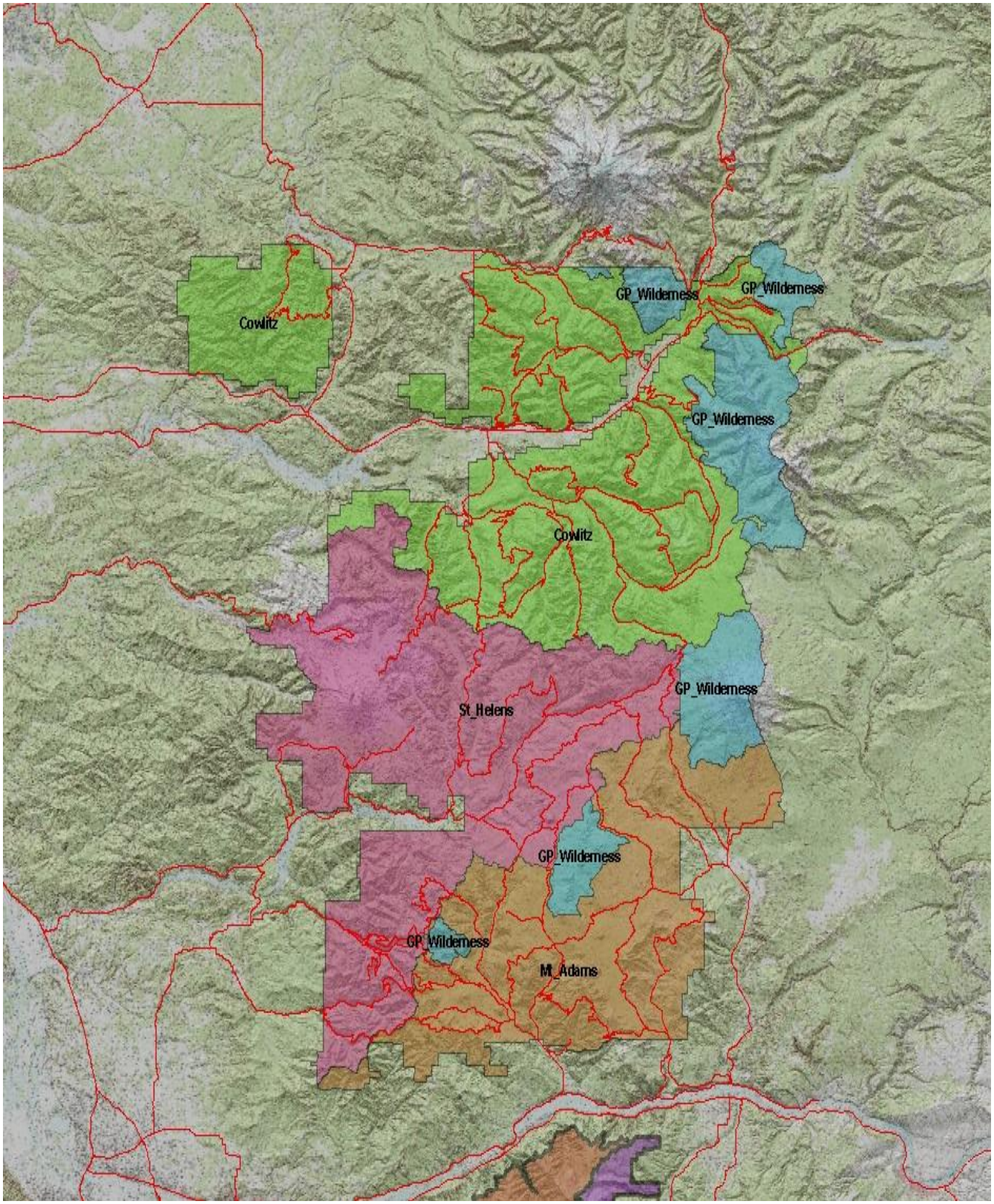
## 3.2 – C. Fire Management Considerations for Specific Fire Management Units

### 3.2.1 Mt. Adams FMU Snap Shot

- **FMU Name:** Mt. Adams
- **Fire Behavior Indicator:** Energy Release Component (ERC)
- **NFDRS Weather Station:**
  - Buck Creek RAWS - NWSID 451917
  - Dry Creek RAWS -NWSID 451924
- **Acres/Agency:** 162,000 acres, Mt. Adams Ranger District
- **Predominant Vegetation Types:** There are two distinct subunits within the Mt. Adams FMU, corresponding to east and west. Vegetation types are delineated along elevation and moisture gradients within the two subunits. On the west side, Douglas-fir and western hemlock forests occupy lower elevations. The lower elevation forests transition to Pacific silver fir forests. At the lower end of the Pacific silver fir range (1,200 to 2,400 feet) Douglas-fir and western hemlock are codominant though a wide variety of conifer species may be present depending on locale. This low elevation type Pacific silver fir type is replaced by moister and cooler Pacific silver fir-mountain hemlock associations at higher elevations. On the east side, grand fir gradually replaces the western hemlock found on lower elevation forests of the west side, while subalpine fir forests replace Pacific silver fir associations. On the far east side of the district, multi-layered grand fir-Douglas-fir-ponderosa pine forests dominate up to approximately 4,500 feet. Above 4,500 feet, subalpine fir and lodgepole pine are the major species with mountain hemlock appearing around 5,500 feet. On wet microsites and north facing slopes western hemlock is still found at low elevations, and Pacific silver fir is found at mid-high elevations.
- **IA Dispatch Office:** Columbia Cascade Communication Center
- **Communities adjacent or within FMU:**
  - Trout Lake, WA
  - Stabler, WA
  - Carson, WA
- **LRMP options available for management response:** Fire suppression strategies depend upon specific Management Area standards and guidelines, alternative suppression strategies to consider include confine, contain and control. Section 3.1.1. Gifford Pinchot Land and Resource Management Plan *and FMU* Guidance, Table 1.3. Management Response Strategies for LRMP Designated and Management Areas, of this document, summarizes management response suppression strategies for specific Management Areas.

**Figure 1.4 Mt. Adams FMU**



### 3.2.2 FMU Guidance

- **Desired Conditions, Objectives, Guidelines, Goals and Standards:** Section 3.1.1. Gifford Pinchot Land and Resource Management Plan *and FMU* Guidance, Table 1.3. Management Response Strategies for LRMP Designated and Management Areas provides a summary of guidance for this FMU.

### 3.2.3 FMU Characteristics

#### 3.2.3.1 Safety

Firefighter and public safety is the primary concern. Limited accessibility, steep terrain, and areas of heavy timber can challenge the efficacy and safety of suppression efforts. Where these concerns arise, suppression tactics that minimize threats to firefighter and safety will be employed, including using aerial support and confine strategies. Recreation and land use closures will be ordered as needed to maximize public safety. Management plans will consider the impacts of smoke on firefighter and public safety both on the incident and in nearby communities. Areas of particular concern include large expanses of standing dead and down timber in the Gotchen Late Successional Reserve, dense reproduction, difficult travel and unreliable navigation on lava beds, heavy fuel loadings, and forecasted east wind events.

- Fire fighter and public safety will remain the utmost priority. Terrain, accessibility, and potential fire behavior will influence fire management decisions. High concentrations of standing dead timber are a major safety concern in portions of the Mt. Adams FMU.
- Accessibility: Unroaded land allocations or poor road conditions may limit accessibility. Ingress and egress will be clearly marked and addressed in pre-engagement safety briefings.
- Lava beds: travel and navigation may be difficult over lava flows.
- Aviation hazards: a map of known aviation hazards on the forest is available.
- Driving: Roads are often primitive and shared by other forest users. Defensive driving is required at all times. Caution should also be taken for wildlife and in areas of poor visibility due to sun/shade and blind turns. Traffic laws are to be obeyed at all times, including en route to an incident.
- Wildland urban interface: The Forest Service will cooperate with local communities to implement Community Wildfire Protection Plans and develop defensible space. Wildfires that have the potential to affect the wildland urban interface will follow a control strategy. Firefighting personnel will be educated in additional threats associated with fires in the wildland urban interface.
- Public use: Prevention efforts will focus on high public use areas. In the event of an incident, care will be taken to inform and evacuate the public where necessary to ensure their safety.
- Smoke: Communities most likely to be affected by smoke from fires in the Mt. Adams FMU are Trout Lake, Carson, Stabler, and Willard. Large fires may affect air quality in the Columbia River Gorge National Scenic Area. Smoke may also affect developed and undeveloped recreation areas. Air quality and smoke management protocols per the Washington Department of Natural

Resources will be followed where required. Smoke affects to will be considered during daily incident evaluations.

- Weather: Mountain weather is unpredictable. Thunderstorms and instability in the atmosphere contribute to fire ignition as well as fire spread. A common thunderstorm track along the Cascades passes over the Mt. Adams FMU, often bringing lighting in June and July. Spot weather forecasts will be requested for all fires requiring extended attack and as appropriate during times of high potential fire behavior.
- Fuels: A wide variety of fuel conditions exist in the Mt. Adams FMU. On the west side, large amounts of fuel and down woody debris are common but large fire potential is often less than on the east side due to higher fuel moisture levels. Down woody debris makes travel difficult and contributes to fire severity and spread. Dense regenerating stands can pose a problem to control where they occur throughout the FMU. On the east side, fuels are accumulating due to fire suppression in areas that historically experiences relatively shorter fire return intervals. In addition, insect and disease outbreaks have caused large areas of standing dead and down timber that are a challenge to suppression efforts and a safety hazard to firefighting personnel.

#### 3.2.3.2 Physical Characteristics

The Mount Adams FMU represents the area covering the eastern portion of the Mount Adams Ranger District including a transition zone along the Cascades that is warmer and drier than rest of the forest. Major drainages include the Little White Salmon and White Salmon River. Elevation ranges from near sea level up around 4,500 feet or the wilderness boundaries, which encompass the tallest peaks. Slope ranges from near level to steep and rugged including two large lava beds.

#### 3.2.3.3 Biological

- Wildlife habitat: Where habitat exists, northern spotted owls may inhabit the Mt. Adams FMU as well as barred owls, pileated woodpeckers, goshawks, and bald eagles. Other wildlife includes blacktail deer, Roosevelt elk, and black bear, cougar, bobcat, and pine marten.
- Rivers and streams provided habitat to sensitive fishes.
- Rare, culturally important, and special forest product botanical resources are found in the FMU.

#### 3.2.3.4 Resources

- Timber: The timber management program provides wood products and positive economic returns. Suppression strategies will minimize the damage to the timber resource on both National Forest and adjacent lands.
- Late Successional Reserves: The late successional reserves are designated based on their potential to provide habitat for the northern spotted owl. Suppression strategies will aim to minimize alternation to that desired habitat designation.
- Recreation: The Mt. Adams FMU provides developed and undeveloped campsites, as well as opportunities for hunting, fishing, hiking and

backpacking. Fires may inconvenience recreational users by either displacement or visual impacts.

- Cultural resources: Resource specialists will determine potential effects of activities on cultural resources including Native American spiritual sites and natural resources. Fire effects will be mitigated as much as possible. Historic structures including Gotchen Guard Station, Peterson Prairie Guard Station, and Red Mountain Lookout will be protected.
- Botanicals: The special forest products programs allows the gathering of boughs, beargrass, huckleberries, mushrooms, Christmas trees, firewood, and other botanicals. Threatened and endangered botanical species will be dealt with in the same way as wildlife. The adaptability or susceptibility of a particular species to fire will be specifically considered along with potential fire intensity and extent.
- Soil: Potential effects of fire to soil include the combustion of surface litter and duff layers, changes in color and chemical composition through the release of carbon, nitrogen and phosphorous in the consumption of live and dead biomass, hydrophobicity, erosion, and debris slides. Low and moderate intensity fires are unlikely to result in effects that significantly influence ecosystem composition and productivity. High severity fires increase the probability for erosion and landslide, but the predominant fire regime over most of the area is one that primarily experiences high severity fire, making these disturbance events within the natural range of variability.
- Wildlife: Northern spotted owls, barred owls, pileated woodpeckers, goshawks, and bald eagles, blacktail deer, Roosevelt elk, and black bear, cougar, bobcat, and pine marten, and many other wildlife species are found in the Mt. Adams FMU. Direct and indirect effects of fire to wildlife vary by species and the timing and intensity of the burn. They can include reduction or loss of habitat, harassment, displacement, or death from fire, smoke, and disturbance from suppression activities. The potential for sedimentation and loss of fish habitat will be address for all fires occurring near major waterways, particularly where the fuel loadings are outside of their natural range of variability.

### 3.2.4 FMU Fire Environment

Historical fire maps indicate several large fires in the Mt. Adams FMU during the mid- to late- 1800s and early-1900s including portions of the Yacolt, Dole Valley, Lewis River, and Willard Fires. A combination of ignition sources contributes to the variability in historical fire regimes in the area. Lightning caused fires were common, but anthropological evidence suggests that local fire regimes were highly influenced by Native Americans and sheep herders who set fires in early fall to improve the production of huckleberries and forage. Railroad companies and escaped silvicultural burns add to the number of human-caused fires. Uncontrolled fires before the era of fire suppression occurred in various landscapes, fuel loading, stages of succession, and under different weather and topographic conditions.

The introduction of fire suppression and federal protection of lands greatly decreased the size and frequency of fires. Recently, most fires occur in summer months, are lightning caused, and are low intensity with some passive crowning. Fire suppression efforts and precipitation that often accompanies summer thunderstorms have kept fires relatively

small. Climatic variations dictate the average frequency of lightning storms and ignitions by influencing the potential for storms and fuel flammability. When an ignition occurs, topography, wind, fuel type, and fuel loading play an important role in the impacts of fire on the landscape.

During a typical fire season, fuels dry progressively throughout the season. Fine fuels dry in July and August while coarse fuels reach their maximum dryness in September. These fuel conditions lead to the maximum number of fires occurring in July and August but most large fires occur in September. Historically, most large fires were human caused, east wind influenced, and in September.

In 2008, the Cold Springs Fire occurred on the south side of Mt. Adams. It quickly spread to nearly 8,000 acres, with a high-pressure system, a thermal low, occupying the area and a Haines index of 6. This early-season large fire helped identify the unstable atmosphere as another indicator for large fire potential outside of the historical trends mentioned.

The Mt. Adams FMU has two distinct fire environments: east side and west side. The east side environment is comprised of dry grand fir vegetation types with drier summers and shorter fire return intervals than the west side. Fires occurring in or near the Gotchen Late Successional Reserve are of particular concern. Spruce budworm outbreaks over the past 30 years have left large tracts of standing dead timber and fire suppression has contributed abundant ladder fuels in the form of grand fir regeneration.

**Fuel Models**

The 13 standard fire behavior fuel models (FBFMs) were developed to serve as inputs to Rothermel's mathematical surface fire behavior and spread model (Rothermel 1972). They represent distinct distributions of fuel loading found among surface fuel components (live and dead), size classes, and fuel types. The FBFMs are separated into grass, brush, timber litter, or slash groups and then broken down further by loading by size class, fuelbed depth, and moisture of extinction.

A relatively large portion of the Mt. Adams FMU is classified as FBFM 10 according to LANDFIRE data. FBFM 10 has the heaviest fuel loading of the timber litter group. Most of the highly productive Douglas-fir- western hemlock forests of the Mt. Adams FMU are FBFM 10. Some of the Pacific silver fir and grand fir forests may fall into this category as well. Anderson (1982) describes it as follows:

> The fires burn in the surface and ground fuels with greater fire intensity than the other timber litter models. Dead-down fuels include greater quantities of 3-inch or larger limbwood resulting from overmaturity or natural events that create a large load of dead material on the forest floor. Crowning out, spotting, and torching of individual trees are more frequent in the fuel situation, leading to potential fire control difficulties…examples are insect- or disease-ridden stands, wind-thrown stands, overmature situations with deadfall, and aged light thinning or partial-cut slash.

FBFM 8 is the next most common type, occurring at high elevations, less productive sites, thinned and treated stands, and in some areas on the eastern portion of the Mt. Adams FMU. It is described here:

> Slow-burning surface fires with low flame lengths are generally the case, although the fire may encounter an occasional "jackpot" or heavy fuel concentration that can flare up.

> Only under severe weather conditions involving high temperatures, low humidities, and high winds do the fuels pose fire hazards. Closed canopy stands of short-needle conifers or hardwoods that have leafed out support fire in the compact litter layer. (Anderson 1982)

FBFM 9 is found along some of the riparian areas. It is characterized by long-needle conifers and hardwoods. Overall, fuels dry out slower than FBFM 8 and 10. Fires run through the surface litter faster than FBFM 8 and have longer flame height but with less intensity than FBFM 10 (Anderson 1982).

Less than 5% of the land is grassy meadows (FBFM 1) and shrub-dominated lands (FBFM 5). The grass models have potential for high rates of spread but that fire behavior is extremely unlikely with the amount of annual moisture received in the study areas. These meadows typically stay green and are considered fuel breaks. In FBFM 5, areas where fires are carried by shrubs and other surface fuels, "The fires are generally not very intense because surface fuel loads are light, the shrubs are young with little dead material, and the foliage contains little volatile material" (Anderson 1982).

**Fire Regimes**

Fire regimes are broken down based on the historical role of fire across a certain landscape without the influence of modern human intervention but including the influence of aboriginal fire use (Agee 1993; Brown 1995). The LANDFIRE models for biophysical settings used in this analysis classify fire regimes into five groups based on average fire frequency and severity indicated by percent overstory replacement. The following fire regime definitions use 25 and 75 percent as severity thresholds between low, mixed, and replacement regimes (FRCC Guidebook Version 1.3.0).

| Group | Frequency | Severity | Severity Description |
|---|---|---|---|
| I | 0-35 years | Low/mixed | Generally low-severity fires replacing less than 25% of the dominant overstory vegetation; can include mixed-severity fires that replace up to 75% of the overstory |
| II | 0-35 years | Replacement | High-severity fires replacing greater than 75% of the dominant overstory vegetation |
| III | 35-200 years | Mixed/low | Generally mixed-severity; can also include low-severity fires |
| IV | 35-200 years | Replacement | High-severity fires |
| V | 200+ years | Replacement/ any severity | Generally replacement-severity; can include any severity type in this frequency range |

The Mt. Adams FMU has fire regime groups III and V. Lands in the western section of the FMU are fire regime group V with average fire return intervals ranging from 35 years to 300 + years. Portions of the eastern section of the FMU, including lands around Trout Lake, in and around the Gotchen LSR, and in the Little White Salmon River drainage are fire regime group III.

#### 3.2.4.1 Fire Behavior

This FMU includes fire regime categories III, V with fire frequency ranging from 35 years in the dry grand fir associations to 300+ years in the western hemlock type. All condition classes are nearly equally represented within this FMU and those most departed from their potential natural vegetation have been either

harvested, burned at the turn of the century or experienced significant mortality due to the spruce budworm. Fuels treatments in the spruce budworm locations (mechanical, prescribed fire) may improve overall condition class. Proximity to the community of Trout Lake and to Yakama nation lands may only allow a control strategy during the peak of the established fire season.

Low intensity fires are the norm throughout the FMU with the exception of the eastern flanks totaling approximately 70,000 acres. The last ten years has seen an increase in both number of fires and acreage burned. This is due primarily to a slight change in the thunderstorm pattern where more recently they have been moving from south to north across the Columbia River directly aligning with the south slopes of Mt. Adams. Drier conditions and record high ERC's have occurred in this 10 year period.

A constant source of ignition is smoking while gathering forest products peaking during the huckleberry season. Historically, the first 2 weeks of August produce an average of six fires ignited by smoking.

#### 3.2.4.2 Weather

Weather data from the Western Regional Climate Center from 1971-2000 at the Mt. Adams Ranger Station shows average maximum temperatures of around 74 degrees Fahrenheit for June and September and 82 degrees for July and August. Average minimums were around 24 degrees in December and January. Average mean annual precipitation is 43.4 inches with less than an inch in each July and August and 1.0-1.5 inches in each June and September. The majority of precipitation falls from November through February in both of the aforementioned areas. Precipitation becomes increasingly higher to the west, up to averages exceeding 100 inches of annual precipitation.

Wind speeds and direction vary, but typical prevailing winds are from the southwest. Historically, fall east wind events have been known to cause drying and significantly influence fire behavior and spread.

Fire season begins June 15$^{th}$ when seasonal rains begin to diminish. Both wet and dry thunderstorms are common in June and July. In a typical fire season, very little precipitation falls during July and the first part of August. A weather event bringing precipitation often occurs in mid-late August, but rarely does this event end the season. Fuels quickly dry out again and ERC's rises throughout September when fuels are at their driest and east winds are common. A season-ending precipitation event typically occurs between late September and mid-October. The Rare Event Risk Assessment Program (RERAP) predicts the probability for a season ending event by the following dates:

| RAWS Weather Station | October 1 | October 7 | October 15 |
|---|---|---|---|
| Trout Creek | 51% | 68% | 86% |
| Dry Creek | 54% | 82% | 99% |